

UNIVERSITY OF CALIFORNIA.

AGRICULTURAL EXPERIMENT STATION.

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Examinations of Miscellaneous Vegetable Substances.

Examination of dried apricots, sulphured and non-sulphured:—The increasing practice of sulphuring dried fruits has raised the question whether or not this process could be considered as in any manner injurious to the health of consumers. According to the more generally prevailing practice, the fruit is subjected to the gas from burning sulphur for a few minutes *before* being placed in the drier, thus producing an article of lighter tint than can be obtained when unsulphured fruit is similarly treated. Others have gone so far as to sulphur the fruit *after* drying, until in some cases it appears almost colorless and translucent. Even raisins have been subjected to this treatment, producing an article of almost weirdly pale aspect.

The following figures throw some light on the question of the amount of sulphuric acid introduced into the fruit by sulphuring, *prior to drying* only: No. 1 was a sample of sun-dried apricots, of very inviting appearance, furnished by Mr. Rud. Jordan, of San Francisco, from his ranch in the Napa Valley; No. 2 was sent by Mr. Geo. Crawford, of Riverside, the fruit having been sulphured *before* drying. The determination gave: Sulphuric acid in No. 1, .067 per cent; sulphuric acid in No. 2, .232 per cent.

It thus appears that the amount of sulphuric acid naturally contained (as sulphates) in the ash of all fruits, had been nearly quadrupled by the sulphuring, so as to form nearly one-quarter of one per cent of the weight of the air dried fruit. Aside from the chemical analysis, the taste could easily observe the difference in favor of the unsulphured fruit. The latter had plainly and decidedly the natural flavor of the apricot, which was at once impressed on the palate when taken in the mouth, without chewing. The sulphured fruit lacked the odor, and the first impression produced on the palate was that of an acid, followed by the natural flavor only after some time, or on chewing. No one tasting in the dark could have mistaken one for the other, or failed to prefer the unsulphured fruit, which nevertheless had a darker tint and would by most persons not have been chosen, by the eye, for its looks.

Apart from the lighter tint secured for the dried fruit by sulphuring, it is claimed that fruit so treated will remain free from insect pests even if afterwards dried in the sun. If this is so it must be because the outside is rendered distasteful to them, as it is to the human palate, by the excess of acid and lack of flavor. Of course, sulphuring *after* drying would kill all eggs that might have been laid during the process; but in that condition the fruit absorbs so much of the sulphurous acid (which afterwards becomes sulphuric) as to be absolutely objectionable on the score of health, besides being deprived of nearly all its flavor.

While therefore a light sulphuring can hardly be considered objectionable on hygienic grounds, the process should be carefully guarded against excessive use; and if it were fully understood by the public that the most inferior fruit can by sulphuring be made to be as light-colored as the best, and that a light brownish color indicates the absence of all artificial bleaching, and the possession of the full flavor by the fruit, the preference would soon be habitually given to the unbleached article. That fruit dried in close driers is exempt from insect eggs without the use of sulphuring, scarcely requires mention.

Examination of barks from the northern islands of Japan.—Sent by Messrs. Richards &

Harrison of San Francisco, for examination as to their possible industrial uses in California, with the statement that they could be obtained in unlimited quantities. Bark No. 1 is $1\frac{1}{4}$ inch thick, $\frac{1}{2}$ inch inside dark reddish; obviously that of an oak resembling, in this respect, the red oak of the Eastern States. The inside layer gives with water or alcohol a reddish solution, of somewhat astringent taste, which on evaporation leaves a gummy residue of the same deep color. This solution yields 6.2 per cent of the original weight (of the inside layer) of tannin; or referred to the entire bark, about half that amount, or three per cent. American tan-barks range from 10 to 12 per cent of the entire bark; so the Japanese bark could hardly compete with them.

Sample No. 2 consisted of two kinds of very light, corky bark; one uniform, light brownish-dun, probably that of a cottonwood; the other consisting of alternating, thin (about 1.25 inch) layers of gray and yellow. Both alike when first immersed in water show about the same specific gravity of .305; after 24 hours immersion, .323. The average specific gravity of cork being about .250, it thus appears that life pre-

servers made of these barks would require to contain one-fifth more bark in order to bear about the same weight in water. If sufficiently abundant, these barks when ground might be used in place of cork for packing grapes, as one of them at least is entirely devoid of odor.

Alcohol extract from "bukach" powder, the powdered heads of *Pyrethrum cinerariaefolium*.—As this extract is extremely useful in the extermination of noxious insects, and is especially convenient as being constantly ready for use in conservatories, greenhouses, etc., by simply mixing it with water in proportions varying from 10 to 30 gallons for each pound of powder, it was thought desirable to determine the amount of matter extracted from fresh powder by alcohol. This cannot be done by direct weighing, on account of the volatility of the active oil; hence the method used was to weigh the air-dried powder, extract it, and again weigh after air-drying. The coincident result of several experiments was that on an average, about 15 per cent of the weight of the fresh powder is soluble in alcohol.

Extract of Eucalyptus globulus or blue gum, now so largely and successfully used for the prevention and removal of scale incrustations on steam boilers, was tested in respect to its contents of tannin, its taste being highly astringent. It was found that a standardized tannin solution would precipitate .337 per cent only of tannin; that beyond these limits, either tannin or gelatine solution would produce a precipitate of about equal amount. After removing the tannin as far as possible by digestion with animal membrane, the acid reaction shown by the extract was found to be equivalent to only .127 per cent of sulphuric acid; an amount so small

that it is doubtful whether the cleansing action upon boilers can be attributed to acid solution.

A core of the Mescal plant, sent to Mr. J. J. Rivers, curator of Museum, June, 1883, by a correspondent in northern Mexico, was examined for the amount of sugars contained in it. The specimen, when received, was slightly dried, of the size of a large pear, of brownish-yellow tint, somewhat flabby and elastic, like a similar lump of crude rubber; but readily cut with the knife, showing an apparently structureless vegetable mass, traversed by a few irregular fibrous bundles. Its taste was intensely and somewhat rapidly sweet. It is understood that the "heart" of the Mescal is thus sold in the markets as though it were a sweet fruit, and for similar purposes. A longitudinal slice was extracted with water and found to contain 9.2 per cent cane sugar, by polarization; 24.08 per cent other sugars, b. copper test; total sugars, 33.28 per cent.

The sugar shown in the "copper test" appears to be mainly fruit sugar or "levulose." The mass, cut into shavings, dries but slowly, and afterwards presents the appearance and almost the taste of candied fruit.

As a curiosity, the Mescal core might find a place on the dessert table. The article recalls to mind the similar use of the small palm indigenous to southern Spain (*Sabal minimus*), the peeled stems or cores of which are at certain seasons brought to the markets of Alicante and Cartagena. It must be admitted, however, that the Mescal core would be more acceptable to most palates, the palm stem resembling in a measure the unripe persimmon or date in its taste.

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